

## ShakeMap Background Information for Software Installation (August, 2013)

**1) *Parametric Data:*** You need to consolidate peak ground motions for each earthquake. PGA and PGV are required and Spectral Accelerations at 0.3, 1.0, and 3.0 sec are highly recommended. Instrumental Intensity comes from the PGA and PGV with our ShakeMap-specific relationship. These parametric data can be in a flat file (later converted to XML format) or queried from a database as we do in southern California.

**2) *Site Corrections:*** ShakeMap requires a uniformly spaced ( $dx=dy$ ) grid of site conditions from which to make site corrections when performing interpolations between stations. We rely on NEHRP Classification (A-E, given as an associated average 30m shear velocity) and their corresponding amplification factors. The factors are built in for NEHRP classifications so it's best if you can construct such a grid: NEHRP 30m shear velocity at uniform sampling on the order of a 1km X 1km for all of your region. If these data cannot be obtained locally from geology or geotechnical data, one can use the global Vs30 Server grid generator at:

<http://earthquake.usgs.gov/research/hazmaps/interactive/vs30/>

The VS30 server currently provides GMT grd files in pixel node registration and ShakeMap works in gridline node registration. You can fix your Vs30 file by:

`grdsample your_vs30_grid.grd -Gnew_file_name.grd -T`

You then configure grind.conf to look at "new\_file\_name.grd" and it should work.

Likewise, local data may need to be embedded in a regional Vs30 data map as obtained from above Vs30 Server, or from other approaches.

**3) *Ground Motion Prediction Equation (GMPE's, or Attenuation Relations):*** We have added several new ground motion prediction equations, GMPEs, (used for filling in data gaps or drop-outs) to the ShakeMap software, including two subduction regressions, as well as crustal regressions. These will be a suitable starting point for you, but you may want to consider GMPEs specific to your region. These are separate PERL modules that can be simply modified from the existing ones.

**4) *Software/Hardware.*** ShakeMap requires the freely-available PERL, MySQL, and GMT (Generic Mapping Tools) and a few other packages. PERL and GMT are used quite extensively so any background with them is advantageous. You will need to assemble the basic GMT-formatted base maps, road, city data files, etc., but I'm sure they are available for your area.

The latest version of ShakeMap, V3.5 available at the svn repository at: <https://vault.gps.caltech.edu/repos/products/shakemap/tags/release-3.5/>

You'll need an svn client to check it out from the repository. The installation and configuration process is described in the document found at [<install\\_directory>/doc/SoftwareGuideV3\\_5.pdf](install_directory/doc/SoftwareGuideV3_5.pdf).

The installation process requires installing quite a bit of third-party software to make ShakeMap work. To simplify the process, we have also developed a virtual machine with the software pre-installed. The virtual machine can be downloaded from:

<https://www.sciencebase.gov/catalog/items?q=shakemap+vm>

It runs on the free VirtualBox software on many systems. Again, see the Software Guide for information on how to customize it for your region of interest.

You probably also should sign up for the *shake-dev mailing list*:

<https://geohazards.usgs.gov/mailman/listinfo/shake-dev>

We use this mailing list to communicate software updates, as well as provide support when people have problems, suggestions, etc.

**NOTE:** The ShakeMap Manual is out of date compared to the Install documentation that comes with the latest version of the software). Worden and Wald, and others are working on an update of the ShakeMap Manual.

UNIX is the Operating System currently for ShakeMap, but you can run UNIX on a PC if that is preferable to a SUN workstation, for example. We are currently running ShakeMap on PC's with LINUX OS, and on Macintosh computers running MAC OSX.

**5) Public Relations.** We have ShakeMap Fact Sheets, but we're in the process of updating them with a more national (rather than California) perspective. We'll make sure you get those when they are printed. In the mean time, I'd be glad to send along some nice PowerPoint Presentations if that would be of any help to you in providing background for potential ShakeMap users in your area (Utilities, Emergency Responders/Managers, Media, Private Companies., etc.)

Well, that's the brief introduction. While it is a sophisticated package, ShakeMap does allow fairly simple customization for local use (local web pages, etc.). We've been making these maps and working on this software for some time now. We'll be glad to help you get it going, but of course we're always overcommitted, so our time may be limited.